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neighboring circuits. Submarine metallic circuits, both insulated and *uninsulated*, and operated upon the open-circuit system, were also experimented upon by Mr. Gisborne, in conjunction with the late Hon. F. O. J. Smith of Maine, during 1858-59, all of these experiments being upon record. D. H. K.

#### Too big to swallow.

Some young men standing on the shore of the Mississippi, June 27, near this place, saw something singular on the water. On going out to it with a boat, they captured it, and it proved to be a catfish with a land-tortoise in its mouth. The fish weighed a little less than twenty pounds. The turtle was about five inches across the back. It was fast within the jaws of the fish, requiring considerable force to extricate it. It was dead. The fish was in a demoralized condition, allowing itself to be captured with the hands.

P. J. FARNSWORTH.

Clinton, Io., July 3.

#### The gyration of a vibrating pendulum.

Referring to Mr. Hendricks's note on the gyration of a vibrating pendulum, in which reference is made to one of my statements, I wish to state that in the original paper the expression of  $\tau$  by oversight was

$$\tau = \sec \theta \times \text{one day.}$$

The error was discovered soon after printing. When this was corrected in the reprint, it was not observed that it would make the sentence quoted by Mr. Hendricks state what was never intended.

W. FERREL.

#### HIGHER EDUCATION AND THE MASSES.

A POPULAR fallacy in respect to the worth of the higher education has rarely been so clearly put as it is by that master of fallacies, Gen. Benjamin F. Butler. In his recent response to an invitation from the National educational association to attend the convention in Madison, Wis., he says, "The higher education of the few mainly affects themselves; but *the education of the masses, which shall leaven the whole lump*, is the foundation upon which the permanency of our government must rest at last." In other words, Gen. Butler asserts that it is the dough, and not the yeast, which acts as the leaven.

Every intelligent patriot is in favor of popular education, but who are to be the teachers of the people? Gen. Butler replies, "It is the education of the masses which shall leaven the lump." The boy is to lift himself over the fence by pulling at the straps of his boots.

It is not even true in politics that the masses leaven the lump: it is the men of intellect who instruct and persuade and incite the mul-

titudes to united action. In literature and science it is quite as absurd to say that "the higher education of the few mainly affects themselves." A doctrine more fatal to the progress of knowledge, or more pernicious to the welfare of the people, could hardly be uttered by an intellectual demagogue. Did the higher education of Plato, Aristotle, Euclid, Pliny, 'mainly affect themselves'? Did the higher education of Homer, Dante, Virgil, Shakspeare, 'mainly affect themselves'? How was it with Columbus, Luther, Newton, Bacon, Faraday, — did their higher education 'mainly affect themselves'? For whose benefit all the researches of Pasteur and Koch, — 'mainly themselves'?

If Gen. Butler were alone in cherishing the fallacy that advanced education is a luxury, which pleases a few impracticable souls, and does no good to the masses, his words might pass unnoticed by *Science*; but this deceptive doctrine sways many, even, of those who are devoted to teaching. It crops out in educational conventions and in educational journals. The fallacy should be pointed out whenever it is uttered. The progress of the masses, the improvement of any age or any people, depends upon great men; great men are nurtured by great ideas; great ideas are developed by higher education, — the education which goes beyond that which is obvious to the abstract and fundamental, — the education which raises hard questions in respect to the unknown, and proceeds to seek the answer, confident that the discovery of every great truth will sooner or later contribute to the welfare of mankind.

This is an education which does not mainly affect the few and cultivated: it elevates the masses. If this truth should ever become clearly understood by our countrymen, they will do as much for higher education as they have done for popular instruction; and a happy day it will be for American civilization. Universities and schools of science will flourish as they have never done before; the government will be served by men who know, and not by men who guess; the public health, intelligence, morality, and prosperity will all be promoted.